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Usage of Derivatives in Business Today

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Duston Hodgkins

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Introduction

Amidst the darkness of trading losses that plagued the financial market and many banks during the financial crisis, a number of small market participants were highly successful. These funds flew under the radar in terms of market news. That is until it was revealed the significance of the gains these funds reported.

John Paulson founded a small hedge fund named Paulson & Company in 1994. In 2007, when he began to bet against subprime mortgages and the United States housing bubble, the hedge fund had \$12.5 billion under management. When the housing market turned south, lead by the collapse of the subprime sector, Paulson's bets paid off huge. His fund increased 590% over the next few years. In 2007 alone, the fund generated \$15 billion in profits from \$12.5 billion in capital. During this same period, American International Group, the largest insurance agency in the country, would be bailed out by the government to the tune of \$180 billion. Federal regulators would state that AIG was too interconnected with the rest of the financial industry to allow the company to go bankrupt. AIG, was the largest failure during the financial crisis, but these gigantic losses stemmed from similar use of instrument as Paulson's strategy.

How did Paulson achieve such success based on his underlying capital? Paulson invested in derivatives, more specifically, Paulson purchased credit default swaps. Derivatives are a financial instrument that's value is based on an underlying asset. In the case of credit default swaps Paulson purchased, the underlying asset was forms of bonds and collateralized debt obligations supported by subprime mortgages. As the mortgages defaulted, the bonds became worthless, and the protection against default, the asset Paulson owned, became worth more.

Derivatives have gained a new sense of infamy recently, due to the magnitude of some trading success stories in this sector of the market. Yet not all businesses are as successful with

the use of these complex instruments. Long Term Capital Management has become a famous example of extreme failure in the financial world. The hedge fund included some of the brightest players in the financial and academic worlds. The firm took complex positions, and generated impressive returns through its early inception. As the market turned in a direction the firm was not expecting, however, soon the company would find itself posting significant losses, and unable to meet many obligations. As the firm's asset base decreased, it would find itself being more and more levered. Eventually, this small hedge fund would be deemed to have too many connections with the rest of the financial industry, and was bailed out by an investment bank coalition in connection with the Federal Reserve.

Following the financial crisis, JP Morgan came out as the largest bank in the United States. In 2012, just four years removed from the financial crisis, the company announced that it had lost \$2 billion in a derivatives trade. The trade was originally meant to be a hedge to other positions the bank held, attempting to decrease risk. Instead, the trader responsible took such a significant position that he would be later nicknamed the London Whale. The supposed hedging trade, which took place in the credit default swaps market, was poorly executed and monitor by the bank. Eventually, JP Morgan would be forced to accept the \$2 billion dollar loss (Silver-Greenberg and Eavis).

How is it possible for derivatives to be the center of both significant gains and insurmountable losses? These instruments have proven over the last few decades to be highly potent and volatile instruments. On the other hand, these instruments have an excellent track record for mitigating risks. The volatile nature of these instruments, a result of the derived disposition of the contracts, however, was not the intended purpose of their creation.

Derivatives were originally created as a form of risk management, not risk creation. Finding their origination in the commodities market in the 19th century, derivatives were intended to be a way for businesses to move around risk. These financial instruments offered the ability to shift risk from those companies that were currently bearing it, but did not want it, to those companies willing to be compensated to take on the risk. Companies then started to ask for more products to be created in order to start hedging more risks. The derivatives market saw significant growth, as more derivatives were created and used more frequently for hedging purposes.

In today's market, derivatives have become an integral aspect of all business models. Most major companies, especially those with international exposure, use derivatives to hedge risks. Many of these companies use these contracts to hedge commodity price risk, exchange rate risk, or to decrease the cost of borrowing. These are risks that these businesses are organically experiencing; the risks are not being generated in the financial transaction.

The market has also witnessed the development of new uses of derivatives. Companies are now using these instruments for speculation and for arbitrage. Speculation involves companies undertaking these contracts with the intention of attempting to make money by predicting the direction of the value of the asset in the future. Companies that are entering a two sided speculation contract are creating risks, not mitigating the risk like the contracts were originally created. Paulson's bet on the direction of the housing market was an example of the use of derivatives in speculation. The county of Orange in California filed for bankruptcy after the county lost more than \$1 billion on speculation in the derivatives market. This trade is a new use of derivatives that differs from the original intentions for the instruments.

Arbitrage strategies have also started to implement derivatives in order to complete the strategy. Arbitrage is the ability to buy an asset and sell it in another market simultaneously, in order to make a riskless profit. Firms that implement these strategies are attempting to take two opposing positions, and collect a small profit, without any exposure. This strategy has now evolved to include the usage of derivatives in order to capitalize on this narrow amount of profit. Since these firms are using derivatives for the purpose of creating arbitrage, these firms are also diverging from the original purpose for derivatives.

Companies have been attracted to derivatives due to the ability to make significant profits. It is clear that derivatives have significant profit potential for all market participants. The market for derivatives largely occurs in the over-the-counter market, which is privately settled and receives very little regulation. The activities that occur in this area are extremely tight-lipped and banks are able to make larger profits, as a result of this characteristic.

The usage of derivatives in today's market has changed from the original reason the instruments were created. Though the use of derivatives for the purpose of hedging is still prevalent, new uses for these instruments have become popular. The use of speculation and arbitrage demonstrates the nature of the change to derivatives convention. The use of these strategies in terms of derivatives use, however, is not just limited to the financial industry. Non-financial companies have started to use derivatives in speculating activities as well. Hedging with derivatives may still exist, but it is speculation that has brought these instruments to infamy. Whether due to incredible success, such with Paulson, or with dramatic decline, as during the financial crisis, these changes to the purpose of the instruments has brought great criticism to the derivatives market. Regardless of the result, it is evident that derivatives usage has significantly changed from the original reason the instruments were created.

Background

A financial derivative is an instrument that is based on an underlying asset, but does not specifically include the underlying instrument in the transaction. According to Timothy E. Lynch, a derivative can be defined as, “a financial instruments whose value depends on or is derived from a secondary source such as an underlying bond, currency or commodity,” (Lynch, *Gambling by Another Name; The Challenge of Purely Speculative Derivatives*). A derivative differs from traditional investments in the sense that an asset is not being purchased. Instead, an investor is solely purchasing a contract with another investor or institution. There is no actual asset being exchanged during the transaction. Many of the traditional derivatives would fall under this definition, such as stock options, and interest rate swaps, but this definition may be over-inclusive in the fact that a stock or a bond could be considered under this definition. For example, it could be argued that a bond and the return it generates are based on a credit rating on the bond. This definition appears to be over inclusive, since may possibly include items that are not thought of as derivatives.

What then is an accurate definition of a derivative? A single definition of a derivative is difficult to present. Instead, all derivatives can be defined by similar characteristics that they share. The first characteristic of a derivative is the fact that an asset is not changing hands; instead, the instrument is a contract between two counterparties. “The value of a derivatives contract stems primarily from the rights to which one is entitled and the obligations one owes to one’s contractual counterparty,” (Lynch, *Derivatives: A Twenty-First Century Understanding*).

The second characteristic is that derivative payouts are also based on future events, happenings, or occurrences that are out of the control of the parties that are under contract. This means that the result of the contract, and which parties receive payment, and which are required

to make payments is defined by a future condition that is outlined prior in the contract. For example, in an interest rate swap, the payments could be based on the future three-month LIBOR rate. Payments will then be decided based on the future value of this rate when the contract is settled.

Finally, derivatives have a zero-sum settlement. This means that, “there is no net gain or loss of overall *monetary* wealth as a result of the transaction,” (Lynch, Derivatives: A Twenty-First Century Understanding). Counterparties are taking opposing positions, and so if a payment occurs, the net gain for one party will be equal to the net loss for the other party. No monetary value is created in a derivative transaction; only transfers of wealth occur between the parties based on the outcome of underlying asset.

Defining financial instruments by these characteristics presents a better idea of which instruments should be considered a derivative, and which should be included. Returning to the example of a bond, it would not be a derivative by this definition, since it is not a contract between two parties. An interest rate swap, on the other hand, would fall under this definition, which is considered an derivative instrument. These characteristics will present the definition of derivatives for use in this paper. Under this definition, items that will be considered a derivative include: options, futures, interest rate swaps, commodity derivatives, and credit derivatives. Under the credit derivatives heading, credit default swaps will be considered a derivative. A credit default swap demonstrates these three characteristics; it is a contract a regarding an underlying asset, usually a bond, the payoff of the contract is based on a future event or circumstance, such as the bond defaults, and the result of the contract is a zero-sum settlement. Other credit instruments do not fit this definition, and so will not be considered a derivative. For

example, a holder of a collateralized debt obligation will receive interest payments based on the underlying tranches or mortgages, and so it is not a zero sum transaction.

Due to the complex nature of derivative instruments, the valuation of these positions are required the creation of new models. Today, a generally accepted and popular model for valuing some types of derivatives is the Black-Scholes model. “The model is based on the assumption that a trader can suck all the risk out of the market by taking a short position and increasing that position as the market falls, thus protecting against losses, no matter how steep,” (Lewis). Today, the Black-Scholes model is commonly used as an option-pricing model. “Nearly every employer stock-ownership plan uses Black-Scholes as its guiding principle,” (Lewis). Many of the market participants implement their own controls and modifications to the model, but most pricing for an options market is done with this model.

Overall, the Black-Scholes model is the most frequently used pricing model for options, and also employee stock-option bonus pricing. This commonly accepted pricing model, however, is not perfect. The original model was designed in 1973, when the internet, high frequency, and arbitrage trading were in the infancy stage. Today, these trading methods have drastically impacted the market, and also how the market reacts and changes pricing. Furthermore, the model assumes that the options are European style, meaning that they cannot be exercised before expiration. Today, however, most options are American style, and can be exercised prior to expiration. Black-Scholes, though the commonly accepted pricing model, is highly flawed in view of the current market. Most businesses and financial institutions apply an altered version of the model, but the overall assumptions of this flawed model still drive the pricing of the majority of options in the market today.

Since derivatives are only a contract on an underlying asset, such a financial instrument can be created by many different sources, not just the original issuer of the underlying asset. There are two main markets for derivatives: exchanges and over-the-counter markets. An exchange is open market, similar to the general stock market, where buyers and sellers of derivatives post prices and settle transactions across the market. In this case, the contracts that are being traded have been standardized. A derivative exchange will define the terms of the contract, and the assets that the contract can be traded on, and the terms, and open the exchange for trading that derivative. From there, buyers and sellers will post their value for the derivative, and the exchange will connect two parties at a willing price, and then collect the initial margin to ensure that the trade settles. Since these contracts that sold on an exchange with many participants, and are standardized, these positions are highly liquid. A party can enter or exit a position, easily and at a price that is very close to the current market conditions.

On the other hand, the over-the-counter market does not involve an exchange. Instead, the contracts are privately negotiated between the two parties. The contracts are not standardized, and can include many different provisions that are not found on exchange-traded derivatives. This is the most popular spot for trading interest rate swaps, forward-rate agreements, and other exotic derivatives. Those parties that partake in this sector are sophisticated market participants, such as banks and hedge funds. Since this area of the market is settled in private, the details of trading in this area are difficult to know, which, in turn, make regulation of this area troublesome. Also, since the contracts are made for specific counterparties, and possess non-standardized terms, these derivatives are significantly less liquid. It is difficult for a party to enter or to exit the position.

Most derivatives contracts that are entered are closed out before settlement, or expire worthless. In the creation of most derivative instrument, the party in the short positions, or the investor that sold the contract is the one that has the ability to make delivery. In a future, for example, the standardized document will allow multiple deliver dates, locations, and quality of the item. The party that is selling the asset is the one that had the discretion in decided what, where, and when to deliver. For this reason, most investors, especially those partaking in hedging, close the contract without delivery.

To show how a derivative contract can lock in a price, a company that needs to purchase corn in one year can be used as an example. The company will need to purchase the corn later, so it is currently in the short position in the market, and will need a long hedge position, so the company will purchase a corn future. The company needs a very specific quality of corn, and so will close the future near expiration, and buy in the spot market, in order to control delivery quality and timing. If the price rises, the future price will rise, and the future contract will gain value. It will be more expensive to buy in the spot, but this increase will be offset by the company's gains on the future. If the price falls, the future contract will post a lost. Though it will be cheaper to purchase in the spot, this decrease in price will be offset by the losses on the future.

The usage of derivatives requires there to be consideration of new types of risks. One risk that is a significant consideration in the derivatives market is counterparty risk. This risk is the risk that, "the counterparty to a financial contract will default prior to the expiration of the contract and will not make all the payments required by the contract," (Fath). Essentially, counterparty risk stems from the fact that a derivative is a contract between two parties, versus the traditional ownership of an asset. Since two parties are facing each other in a derivative

transaction, if the party that is required to make a payment is unable to settle the transaction, the party that should have received payment, cannot settle with another party. When entering a derivative position, an investor is undertaking counterparty risk; the investor is at risk if the counterparty that is being faced is unable to payout their portion of the contract. When an investor purchases an actual asset, such as a share of stock or a bond, the investor does not have counterparty risk, since the investor owns the asset. The future cash flows of this position are not dependent on another investor or institution; instead it is only based on the value of the asset that the investor purchased. As the market undertakes more derivative positions, there are more types of the risks that coincide with the investment. This requires increases and changes to both the market's, and individual investor's, valuation of such positions.

A major institution in the market in terms of measurement of risk and investment decision is the rating agency industry. A few firms, including Moody's Investor Service and Standard and Poor's, dominate the ratings industry. These companies issue ratings for certain financial instruments, such as a bond. The ratings are the company's judgment regarding the financial security of the investment (The Technical Committee of the International Organization of Securities Commissions). Though the rating agencies are highly concentrated on the fixed income sector, versus the derivatives sector, the rating process is still integral to the derivatives market. Many types of derivatives are based on instruments that may be evaluated by the ratings industry. For example, a credit default swap is a derivative based on a bond, which will have a credit rating from a rating agency. The payment and collateral demanded by the seller of the credit default swap, is usually based on the rating provided by the agency. Furthermore, rating agencies can also provide a rating a company, versus a specific entity. This information is frequently considered when evaluating counterparty risk. Despite having no direct influence on

the derivatives market, rating agencies have played a significant role on derivatives, such as during the financial crisis, as will be discussed below.

History

The usage of derivatives has a longer history than most would expect. The first transactions that could fit under the definition of a derivative can date back before the Common Era. Examples of trading private labor for future payments, which could be considered a form of futures contract, can be seen as early as the Bible (Chance, A Brief History of Derivatives).

The first example of derivatives similar to today's instruments originated regarding commodity trading. The Chicago Board of Trade opened in 1848. Farmers utilized Chicago's central location as a storage area and market place for grain during the harvest season. Since the harvest was seasonal, prices of grain oscillated with the season. Farmers sought a way to stabilize prices, and so created a "to-arrive" contract. These early derivatives were used by farmers as a mechanism to lock in a price of grain that they could sell the crops for, and avoid the drastic swings. These contracts were sold, with oversight from the Board of Trade, and eventually would become standardized contracts by 1865 (Chance, A Brief History of Derivatives).

The Chicago Mercantile Exchange's predecessor was founded in 1871, as the Chicago Produce Exchange. Derivatives trading would take a significant hit in the late 19th century, as many countries banned derivatives trading. The state of Illinois would also implement a similar ban on the trading of some derivative instruments (Chance, A Brief History of Derivatives).

Derivatives usage continued to mainly focus on commodities until the 1970's. The expansion of globalization had allowed currencies to flow freely across countries. The Chicago

Mercantile Exchange, which formed in 1919, started to allow currency futures, the first futures, not based on physical commodities. Soon, a rivalry between the Chicago Mercantile Exchange and the Chicago Board of Trade developed. After the Chicago Board of Trade created the first interest rate based derivative in 1975, the Chicago Mercantile Exchange created a derivative based on Treasury bills.

During this period, the Chicago Board of Trade also created the first option exchange, the Chicago Board Options Exchange. Prior to this creation, options existed, but were only offered by a few, select dealers in the OTC version. The creation of the exchange also coincided with the publication of the Black-Scholes model. The market makers for the CBOE now had a model to accurately price the positions that were being offered on the exchange. Soon options trading would become popularized on many other exchanges across the United States.

With derivatives having been popularized for many years, the 1980's saw the first rise in derivatives usage by corporate America. Recent graduates of business school had gained experience and knowledge about derivatives usage in a business model for the first time. "New products were rapidly created to hedge the now-recognized wide variety of risk," (Chance, A Brief History of Derivatives). New instruments and private contracts were being created and settled at an unheard of pace, as the business world realized the ability to hedge risks of business models. As more risks needed hedging, the finance world created more complex instruments with complex modeling.

The escalation of the derivatives market into non-financial institutions stemmed from the desire to hedge. Previously companies held these risks, without the ability to mitigate them; derivatives did not create these risk, they existed prior. Now, however, financial instruments were being developed to eradicate these risks, and more hedging techniques developed. "What

the derivatives do... is they allow parties, companies, financial institutions, governments, to shed the risks that they don't want to take and take on other risks that they would prefer," (Brickell).

As many companies were able to hedge these risks at lower cost and more efficiently than holding the risk, more companies and industry joined the hedging game, further developing the early derivatives market. "There are series of epiphanies as you realize we could manage commodity price risk, equity price risk, the risk of changes in weather, the risk of changes in the credit quality of a borrower, by using these same techniques. And as we apply the risk-management approach to more and more kinds of risk, the business grows," (Brickell).

The early usage of the derivatives markets was highly concentrated on the aspect of hedging. Companies were not entering into these contracts as a means of increasing business or revenues. These contracts were being created to meet the demand from corporate America of mitigating risk. The leaders of an automobile company would demand futures contract on the cost of steel, as a way of locking in a maximum price they would have to pay for this necessary commodity. "Derivatives, in essence, are insurance policies that various players on Wall Street and in the business world enter into to protect themselves from unforeseen calamities," (O'Brien).

These early derivatives were able to achieve hedging, or mitigating a certain risk, by transferring risk through a guarantee. The buyer of the contract would issue a payment, or a series of payments, according to the contract. The seller would then guarantee to deliver an asset at a certain price in the future. The seller now undertakes the risk that the asset may change price. The seller must deliver the asset at the set price in the future, and so if the asset changes prices, they are liable for the difference. The buyer no longer holds the risk of the asset being at a different price in the future; there is now a guaranteed maximum or minimum price. If the price

risers or falls, the buyer can execute the contract at the set price in the case of options, or has accrued value on the derivative position for other instruments. The buyer has locked in a price, and has eliminated this risk (Chance, Why Derivatives?).

Why then were the early issuers of derivatives willing to enter these derivative contracts? “One of the reasons is because the people who write derivatives contracts make a lot of money off of it,” (O'Brien). These early contracts were insurance policies for many of the companies that were purchasing. The counterparty of the hedge would most likely not have to pay up. The option would expire worthless, and the bank would have collected a fee or reoccurring payments throughout the life of the contract, without having to pay anything out. Did the issuers of the early derivatives enter the market to make a profit? Of course, financial institutions such as investment banks and hedge funds attempt to make a profit using financial instruments. Was this unwanted or inefficient issuance? Those businesses that were undertaking the other side of the contract were demanding these hedges. Corporate America desired the ability to mitigate risks; the positions were not pushed or sold to the companies. Early derivatives were a useful and beneficial instrument. Value was being created by these derivatives since at least one side of the contract was gaining from the ability to mitigate risks. Timothy Brickell, former chair for the International Swaps and Derivatives Association, argues that derivatives, “allow people to manage the risks to which they're already exposed at a lower cost more efficiently than they were able to manage them before derivatives came on the scene,” (Brickell).

With many new entrants into the financial markets, many new market participants had difficulty understand that new risks were being created, even as the companies were attempting to mitigate other risks. Many of these new risks, such as counterparty risk, were difficult for non-financial companies to understand, especially as complex position started to become popular.

Henry Kaufman, former director at Lehman Brothers, argues that, “It was very difficult for participants to realize the totality of this risk taking in the system,” (Kaufman). Companies that had never been involved in the financial markets were entering full force, and willing to pay for the ability to dump what they thought was all of the risk on a counterparty. No consideration was being given to what new risks were being created by these transactions.

In 2006 the modern day Chicago Mercantile Exchange was created with the CME’s acquisition of the Chicago Board of Trade. The merger ushered in the current situation regarding derivatives trading in the United States. No longer were these exchanges only trading commodity futures. At the time of the merger, derivatives usage had ballooned, including the advent of Credit Default Swaps (Chance, A Brief History of Derivatives). The growth and eventual merger of these exchanges and derivative markets resulted from organic growth. New derivative instruments were created as a result of demand, versus creating a product and then forcing it upon market participants.

Derivatives Growth

In recent years, the derivatives market has expanded at an incredible pace. Today, the derivatives market’s notional value outstanding in the derivatives outpaces the world’s gross domestic product, equity market, and bond market. Notional amount is the amount of the underlying asset that the contract is based. For example, a credit default swap that is insuring a corporate bond worth \$10 million would record a notional amount of \$10 million (Sundaram). “How can the derivatives market be larger than the entire world’s financial wealth? Because the same assets might be involved in several different derivatives,” (Leibenluft). The derivatives market has seen

such significant growth and popularity, that there are currently multiple dollars worth of derivatives out per each dollar of the underlying assets.

The table below outlines the growth of the derivatives market by type of market from 1998 to 2011. Both the OTC markets and exchange markets have seen significant growth, with each market registering double-digit growth. The OTC market now comprises \$647 trillion worth of notional value. This market alone is larger than the rest of the financial world. Considering the fact that the OTC market considers contracts that are privately negotiated and settled, this is a significant feat. These contracts are noticeably more difficult to negotiate and settle, making this growth even more astonishing. Since these private contracts require more effort to settle, they are usually accompanied with larger fees for brokers as well, which could explain the market's concentration on this area.

Derivative Market Growth from 1998-2011			
(in billion USD)	1998	2011	Annual Growth
Over-the-Counter Markets	80,309	647,762	17.42%
Exchange Markets	13,615	58,332	11.84%

Source: (Sundaram)

The smaller of the two markets, the exchange markets, is primarily composed of options and futures market. As can be seen in the table below, the options sector of the exchange market is now the largest sector, and has seen the largest growth since 1998. Options have seen significant expansion in the types of strategies and the availability of the options to investors, which has been a significant driving force for this nearly 16% annual growth rate. Despite this growth in options, the exchange market still only comprises about 8% of the derivatives market.

Exchange Market Growth from 1998 to 2011			
(in billion USD)	1998	2011	Annual Growth
Options	5,260	35,402	15.80%
Futures	8,355	22,930	8.08%

Source: (Sundaram)

Breaking down the OTC market down further, it becomes easy to see that the driver of this market is the interest rate swap market. The table below outlines the growth of the different sectors of the OTC market from 1998 to 2011. The interest rate swap sector comprises \$504 billion of the \$647 billion market. This means that interest rate swaps alone are 78% of the OTC market, and 71% of the entire derivatives market in notional value. The size of the market does not paint the entire picture as well. This sector has grown at an astonishing 19% annual rate. With the immense size of this market, and the breakneck pace of growth, interest rate swaps are the driving force for the development in the derivative markets (Sundaram).

Over the Counter Market Growth from 1998-2011			
(in billion USD)	1998	2011	Annual Growth
Interest Rate Swaps	50,015	504,098	19.45%
Futures	18,011	63,349	10.16%
Commodity	408	3,091	16.86%
Credit Default Swaps	-	28,633	12.22%
Equity Based Contracts	1,488	5,982	11.30%

Source: (Sundaram)

From non-existent to the third largest traded derivative, the credit default swap has become a popular financial instrument. The credit default swap was created in the mid 1990's for use of protection against commercial loans. It was not until the late 1990's and early 2000's that

financial engineers started to generate the instrument on corporate bonds. The instrument grew in popularity from its humble in comparison beginnings of \$900 billion in 2000, to over \$28 trillion in 2011 (Zabel).

With the increase in the prevalence of derivatives throughout the economy, what benefit is being generated through the use of derivatives? It is easy to see the benefit to companies using the derivatives for hedging purposes. As previously discussed, these companies have decreased the risk undertaken in a normal business process. “If a counterparty hedges a pre-existing risk with the use of a derivatives contract, he obtains insurance value from the derivative,” (Lynch, *Derivatives: A Twenty-First Century Understanding*). The counterparty, usually a financial institution, also has a significant incentive to continue the growth of this market, and enter derivative contracts. According to Kaufman, with derivatives one could, “could do a relatively large volume of business with a moderate amount of overhead and secure a very significant profit. And that was very enticing,” (Kaufman).

Derivatives in the Financial Crisis

The recent financial crisis that occurred in 2007 has brought the issue regarding the growth and usage of derivatives from Wall Street to Main Street. The financial crisis originated with a lapse in the lending standards for many commercial entities. The United States had a significant in-flow of capital from abroad, and saw standards for mortgage lending and securitization relaxed. Quickly, sub-prime mortgage lending became a popular practice. Many new companies were created that would collect a fee for connecting new mortgage candidates, and banks that had the ability to lend. Many people, who would have never been approved to purchase a home before, were now given the ability to make extravagant home purchases. “Lending standards collapsed, and there was a significant failure of accountability and responsibility throughout each level of

the lending system,” (Financial Crisis Inquiry Commission). Mortgages were being made on the assumption that housing price would rise indefinitely. Borrowers would then be able to enter another mortgage against the house if they were unable to make payments.

The implementation of the securitization process promoted this ability for lenders to make poor lending decisions. “The originate-to-distribute model undermined responsibility and accountability for the long-term viability of mortgages and mortgage-related securities and contributed to the poor quality of mortgage loans,” (Financial Crisis Inquiry Commission). The mortgage would then be sold to larger institutions that would combine many mortgages together in the securitization process. The result of the process would be a bond, called a mortgage-backed security, issued backed by the mortgage payments. Mortgage-backed securities would then be divided up into tranches, or different segments with different rules for prepayment risk, and distribution of interest. Each mortgage-backed security would yield highly rated sectors, a supposedly safe investment, and a lower, non-investment grade tranche.

Regulations on many types of financial institutions required these institutions to invest based on credit ratings. Many of these financial institutions then demanded for mortgage-backed issuance to become safer investments. This demand created the push to collateralized debt obligations. Collateralized debt obligations would allow risky tranches to be divided up and distributed amongst less risky tranches, supposedly mitigating the risk of the tranche. These securities were in high demand: “Many of these risky assets ended up on the balance sheets of systemically important institutions and contributed to their failure or near failure in the financial crisis,” (Financial Crisis Inquiry Commission). This ability to sell all aspects of the MBS through the use of CDO’s created an ever increasing demand in mortgages, and reliance on sub-prime lending. Issuing mortgages that were never going to be repaid became almost commonplace.

“The Commission concludes that firms securitizing mortgages failed to perform adequate due diligence on the mortgages they purchased and at times knowingly waived compliance with underwriting standards,” (Financial Crisis Inquiry Commission). These “junk” mortgages would then be securitized and placed into a collateralized debt obligation, making many of the mortgages in these supposedly secure instruments highly unstable.

Rating agencies, such as Moody’s Investor Services and Standard and Poor’s, played a significant role in many institutions investment decisions. These services would place a rating on the mortgage-backed security and collateralized debt obligation, to give investors an idea about the security of the investment. However, there was a shift in many of these services, from issuing quality ratings, to a focus on revenue generation, since these companies were fee for service in the rating issuances. “The Commission concludes that the credit rating agencies abysmally failed in their central mission to provide quality ratings on securities for the benefit of investors,” (Financial Crisis Inquiry Commission). Many of these services were willing to hand out their highest ratings to most issuances, without fully understanding the underlying mortgage, despite the fact that this was the driving force for repayment. These services were using archaic models, and had poor internal controls, and as a result generated significantly inaccurate ratings.

The usage of credit default swaps for purpose of insuring the downside risk of the position furthered the idea that these were secure investments. Credit default swaps became so incredibly popular, however, many of the issuers, such as AIG, were significantly exposed if these mortgages started to default. Since the credit ratings underlying the collateralized debt obligations and mortgage-backed securities were AAA-rated, however, the sellers of the credit default swaps believed that these credit default swaps were unlikely to be exercised. As a result,

credit default swaps were being sold with low premium collection, and minimal margin being posted.

Eventually, as the housing bubble became clear, speculators started to enter the market. Speculators would create synthetic collateralized debt obligations to sell short, or would take up naked positions in a credit default swap. These naked positions were ones where an investor would purchase a credit default swap on a mortgage-backed securities without actually holding the underlying security. It was a method for investors to speculate on the housing market. If housing prices collapsed, the mortgages would start to default, and then the mortgage-backed securities and collateralized debt obligations would default. The speculator would be able to receive a payment, without having ever purchased the actual security, only the credit default swap.

When the housing market finally collapsed, due to the fact that housing prices stopped the perpetual rise, a financial chain of events was triggered. Many large financial institutions had exposure to the housing market through the mortgage-backed securities, collateralized debt obligations, and credit default swaps. Reliance on short-term funding to meeting many of the requirements and cash demands that were beginning to be called started the collapse of Bear Sterns and Lehman Brothers. Lehman was a large OTC derivatives dealer, and therefore saw a significant run when the housing market collapsed. The federal government decided to not bailout Lehman, and “added to uncertainty and panic in the financial markets,” (Financial Crisis Inquiry Commission).

As many collateralized debt obligations and mortgage-backed securities began to default, the dealers of credit default swaps were being obligated to pay the notional value of the assets that they insured. Since many of these were settled in the OTC market, there is less

regulation, margin requirements and posting were frequently inadequate. The government would eventually bail out AIG, the largest issuer of credit default swaps. “AIG was so interconnected with many large commercial banks, investment banks, and other financial institutions through counterparty credit relationships on credit default swaps and other activities such as securities lending that its potential failure created systemic risk,” (Financial Crisis Inquiry Commission).

As the financial market was on the brink of collapse, the rest of the nation entered into a panic. The stock market froze, and started posting significant losses. The scale of the losses caused the credit markets to dry up. “A series of actions, inactions, and misjudgments left the country with stark and painful alternatives—either risk the total collapse of our financial system or spend trillions of taxpayer dollars to stabilize the system and prevent catastrophic damage to the economy,” (Financial Crisis Inquiry Commission). Eventually, the Financial Crisis Inquiry Commission would state:

The Commission concludes the unchecked increase in the complexity of mortgages and securitization has made it more difficult to solve problems in the mortgage market. This complexity has created powerful competing interests, including those of the holders of first and second mortgages and of mortgage servicers; has reduced transparency for policy makers, regulators, financial institutions, and homeowners; and has impeded mortgage modifications. The resulting disputes and inaction have caused pain largely borne by individual homeowners and created further uncertainty about the health of the housing market and financial institutions (Financial Crisis Inquiry Commission).

As argued previously, credit default swaps fit under the definition presented of derivatives. As a result, derivatives played a significant role in the financial crisis. The OTC derivatives market was the location where many of the events that lead up to the financial crisis occurred. Financial institutions that had a large presence in these markets were the ones most adversely impacted by the crisis.

As a result of the financial crisis, the government implemented significant financial reforms and regulations. The most wide sweeping change can in 2010, with the acceptance of the Dodd-Frank Act. The Dodd-Frank attempted to implement changes to Wall Street that would help to prevent another crisis. Among significant changes to financial oversight, “the Dodd-Frank Act imposes more stringent regulatory capital requirements on financial institutions,” (Morrison & Foerster). Despite these significant changes, some argue that the real problem lies in the complex nature of derivatives.

Hedge Funds and Derivatives

Another aspect of the modern financial industry that has played a significant role in the growth of derivatives is the development of hedge funds. A hedge fund is a private investment vehicle that faces less regulation on than other investment options, such as mutual funds. For this reason, hedge funds are not open to general investment by the public. In order to invest in a hedge fund, a person must have substantial capital available, and knowledge about the financial industry. Due to the decrease of regulation, hedge funds are able to pursue all types of investments. Many hedge funds are highly specialized, such as being a “short” fund, which makes money through taking only short positions. Other funds are less concentrated, attempting to capitalize on the investment manager’s ability to make investment decisions. Overall, hedge funds use complex strategies to attempt to outperform the market and other hedge funds.

Hedge funds gained significant popularity in the early 1990’s. Originally, hedge funds were created as a vehicle for investors to place their capital with highly skilled managers. “Wealthy individuals invested their capital alongside ‘talented’ traders expecting out-sized return to their investment irrespective of general market conditions,” (Fung and David). As this type of investment grew, hedge fund managers soon had billions of dollars in capital, and the ability to

leverage that capital even further. Today, hedge funds have nearly \$1 trillion in assets under management, and have increased in number of funds by five-fold (Fung and David).

Hedge Fund Growth from 1997 to 2010		
	1997	2010
Number of Hedge Funds	1,205	6,182
Assets under Management	\$ 156,000,000,000	\$ 945,000,000,000

Source: (Fung and David)

Hedge funds have become infamous for using derivatives to meet profit demands, and to complete the complex strategies. “The profitability of most hedge fund strategies is driven by effective use of leverage,” (Fung and David). Since hedge funds do not have reporting requirement, it is difficult to know what is on the funds’ balance sheets. Leverage does not necessarily mean the hedge funds are using derivatives. Instead, leverage could also include undertaking debt. The complex strategies that many hedge funds are trying to implement, however, imply that hedge funds are most likely undertaking derivatives. Strategies, such as equity market neutral, can be completed most efficiently, and therefore most inexpensively, through derivatives. Hedge funds are also undertaking a significant amount of derivatives. “It is common to find hedge fund balance sheets that substantially exceed in size the equity capital of the vehicles,” (Fung and David).

Hedge funds have made a significant impact on the derivatives market. The funds undertake significant positions, leveraging the nearly \$1 trillion of real assets on their balance sheet multiple times. This means that the rise of hedge funds had played a significant role in the development and growth of the derivatives market. Moreover, their usage of derivatives, to meet

strategy and profit metrics, has been integral in the development of the derivatives market. These major market players have been using derivatives to post significant gains and have demonstrated these derivatives strategies to the rest of the market. Hedge funds set the stage for other to follow in their footsteps—to use derivatives for profit generation over risk management (Fung and David).

Derivatives in Non-Financial Industries

The derivatives market has grown and morphed significantly throughout the early 21st century.

The entrance of major financial institutions through the sub-prime mortgage era, and the development of the hedge fund industry have both been key to this transformation. Yet, as the derivatives market's major sectors continue to be interest rate swaps and futures, non-financial corporations have continued to be a presence in this market. Have these companies changed the way they use derivatives?

Derivatives continue to be a significant aspect of the business models of many companies. According to a survey of the top 500 largest companies of the world, “94% of these companies use derivative instruments to manage and hedge their business and financial risks,” (International Swap and Derivatives Association). Derivatives have become increasingly popular in the balance sheet of companies that are outside of the financial industry. “The survey found that foreign exchange derivatives are the most widely used instruments (88 percent of the sample), followed by interest rate derivatives (83 percent) and commodity derivatives,” (International Swap and Derivatives Association). These companies that are entering the financial market are using the derivatives as a hedging technique. “The vast majority of these corporations rely on derivatives to hedge a range of financial risks to which they are exposed in the normal course of business,” (International Swap and Derivatives Association).

One example of a non-financial company that started to use derivatives is Hershey's. Hershey's is the largest producer of confectionary goods in the United States, and is a major global leader in chocolate. One of the company's largest expenses is the purchase of cocoa for use in manufacturing. Since cocoa is a crop, supply and price are highly volatile, and subject to weather, disease, and political unrest. Hershey's has started to engage in the purchasing of future contracts for cocoa. The company purchases these contracts as a way of mitigating the risk of price fluctuations. The future contracts guarantee Hershey's a cost structure, and allow it to not have to increase prices to consumers if cocoa prices were to increase (The Hershey Company).

The derivatives market has seen significant development over the past two decades. The size of the market has grown at an unprecedented pace. More companies today are getting involved and using this current market. Not only has the market created new instruments in this area, but also the usage of the instruments has seen change throughout this period. Hedge funds have grown in presence, and are using derivatives to meet unique, profit generating strategies. The financial crisis was demonstrative of how the financial industry currently employs derivatives.

Today's Usage of Derivatives

Today's usage of derivatives has seen the development of multiple strategies, into which companies incorporate derivatives. The use of hedging through derivatives is still highly prevalent. Companies, both in-and-out of the financial industry have begun to use derivatives as a method of speculating and generating income. Arbitrage firms have also started to use derivatives as a method creating arbitrage opportunities. The cases of Enron, John Paulson,

Orange County, Exchange Traded Funds, and Long Term Capital Management are all demonstrative of the methods of using derivatives in today's market.

Hedging

Hedging, which was the original purpose for the creation for derivatives, continues to be one of the uses of these instruments today. As previously discussed, derivatives are commonplace for risk management techniques by corporations both in and out of the financial industry. Derivatives today, however, do still have a different role in hedging techniques.

At the core of hedging, derivatives allow a simple transfer of risk. When a company purchases a derivative as a part of a risk management strategy, the risk is not eradicated. Instead, the risk has been moved. A derivative allows risk to be shifted from those unwilling to hold it, to those willing to take on the risk. The counterparty to the hedger, therefore, will be a speculator—someone willing to take on risk in hopes of receiving a payment regarding the future value of an asset.

Hedging is not just for non-financial firms. Investment banks, mutual funds, and other financial institutions frequently use derivatives as a hedge as well (Sill). If the risk taker in a derivatives trade is a bank or a dealer, it frequently takes an opposite position in order to hedge the risky position, and collect a spread between the two positions. Banks frequently hedge positions or entire firms through the use of derivatives. When a bank enters a contract with another firm, as a method of reducing counterparty risk, the bank will purchase a credit default swap on the debt of the other firm. Since banks are also restricted by the regulations on how much risk can be undertaken in terms of capital available, banks frequently will hedge positions as a means of freeing up capital (European Central Bank).

Speculation

Speculation is always thought of as the big reward to the market. Investors that took up significant speculation positions and won big are frequent market headlines. Speculation is also purported to be the biggest risk to take in the market. Today, speculation has extended into the derivatives market. These instruments, which were designed to secure an underlying asset, are now being bought and sold, without the underlying asset.

Speculation is a broad term, though can usually be defined as an investment process where the investor is making a judgment call on the direction of the value of an asset in the future. According to Keith Sill, speculation in the derivatives market involves an investor, “betting that the price of the underlying asset or commodity will move in a particular direction over the life of the contract. For example, an investor who believes that the French franc will rise in value relative to the U.S. dollar can speculate by taking a long position in a forward contract on the franc,” (Sill).

Any derivative instrument can be used to speculate; therefore, speculation is commonplace in each area of the derivatives market. Since the inception of derivative, which originated in commodities, investors have looked to take a position on the direction of prices and capitalize. Speculators tend to flock to the derivatives market for multiple reasons. First, using derivatives levers an investor. As the investor’s decision starts to pay-off, it will be significantly magnified if the bet was placed in the derivatives market. Second, derivatives take very little capital to make those significant bets. When entering a derivatives contract “neither party puts any money up-front,” (Sill). This allows investors and firms to speculate multiple times over on a smaller capital base.

Today, speculators play an important role in the derivatives market, despite receiving frequent criticism for their investment technique. The fact that there are so many market

participants waiting to take positions in all directions creates more liquidity in the market. This means when a business looking to use derivatives for another purpose, such as hedging, the firm will not struggle to find a speculator that is will to be a counterparty, believe that the position is profitable. Since many of the derivatives are OTC and non-standardized contracts, liquidity can be a frequent problem in the market. Speculation, however, is so frequent and popular that this risk has been mitigated for many firms (Sill).

Speculation has become routine in the derivatives market. Not only have financial firms begun to use derivatives as speculation, but speculation in derivatives also occurs in non-financial firms. According to one study, the usage of certain derivatives by non-financial firms was, “determined by both hedging and speculative motivations,” (Chernenko and Faulkender). The usage of derivatives in non-financial firms can help to supplement the earnings by a company’s normal business activities. In fact, according to this study, firms, “appear to use interest rate swaps to speculate when their executive compensation contracts are more performance sensitive and to manage earnings,” (Chernenko and Faulkender). Evidently, business leaders outside of the financial world are now using derivatives in a speculative manner to supplement their business. This is not undertaking of financial position to manage risks. These businesses are taking on derivatives—and in turn risk—as a means of generating revenue and profit for their firm.

Many companies have started to turn to using derivatives and financial techniques for income generation since income from derivatives, even if being used for hedging is treated as ordinary income. Enron is an excellent example of a firm that started to drift from the original business in favor of financial derivatives. Enron originated as an energy producer, but at the time of the firms collapse, the company had become a full-time energy derivatives dealer. “Over time,

Enron shifted its focus from the bricks-and-mortar energy business to the trading of derivatives,” (Partnoy). Eventually, Enron would engage in a number of fraudulent activities, “Enron’s reported earnings from derivatives seem to be more imagined than real,” (Partnoy). Following the fallout of the scandal, Enron would eventually file for bankruptcy, and close for business.

Enron was engaging in a business activity that directly diverged from the firm’s original business model. The company was able to record revenues from the trading aspect, making it appear that the company’s core business was profiting, when it turn, it was financing that was generating the bottom-line growth. Despite being an extreme example, Enron is indicative of the pull of business leaders to supplement earnings and revenues through the use of derivatives. These companies are not using derivatives as a hedging technique—they are attempting to make money, not manage risks.

As discussed previously about the financial crisis, many investors used credit default swaps and other derivatives to place a bet on the direction of the housing market along with the value of mortgage-backed securities. These investors were purchasing these positions as naked—they did not have the underlying asset that was being insured. As a result, the investors were hoping they would default to receive a payment when the underlying asset moved in their favor.

John Paulson, head of the hedge fund Paulson & Company, has become famous for his success in using derivatives to speculate against the housing market during the financial crisis. Paulson’s fund flew quickly to prominence after making nearly \$15 billion in the fallout of the subprime mortgage crisis.

Paulson, who started in mergers and acquisitions, became aware of the potential profit in the housing market in 2005. Paulson studied thousands of mortgages and the practice of

subprime lending. Realizing the housing market was in a bubble, that would have to deflate eventually, Paulson sought ways to short the housing market. Conventional wisdom at the time understood that there was a housing boom, and thought that if it ever declined, the Federal Reserve would mitigate it by slashing interest rates. There was no way the housing market would crash, so it could only continue to rise.

Paulson started to short the housing market in multiple ways. His fund took short positions in an index that tracked subprime mortgages. His fund was also short against multiple collateralized debt obligations. Finally, Paulson entered into many credit default swap contracts on collateralized debt obligations—which were based on mortgages—he thought would eventually default. Paulson argued that these positions were actually cheap. Rating agencies had given them AAA-ratings, and so the credit default swaps were very inexpensive, despite the fact that the cash flows were based on bad mortgages.

Eventually the housing market made a turn for the worse. As banks looked to purchase insurance on mortgage-backed securities and collateralized debt obligations, Paulson's credit default swaps increased in value. Eventually, Paulson's fund in the housing market would increase 590% while the rest of the market squandered (Zuckerman).

Paulson's actions with derivatives can be defined as speculation. Paulson and his firm were making a decision based on the direction that they believed the housing market would head. The purchasing of derivatives, in this case credit default swaps, was done without holding the insured asset. For this reason, Paulson was not attempting to hedge a position. He entered the contracts in the hope that the position would settle, or would increase in value if the housing market crashed. Paulson was not attempting to offset his position with another position to create arbitrage. His actions were purely speculative.

Despite Paulson's overwhelming success at using derivatives to speculate, the result is not always the same with other firms. There are also multiple instances of investors using derivatives to speculate and losing significant money. Another famous case about the use of derivatives pertains to Orange County's bankruptcy in 1994. Orange County became significant more reliant on investments to generate revenue, after the state of California slashed funding of counties. Orange County invested in a number of derivatives, speculating that interest rate would not increase. After selling the derivatives short, the county started to buy fixed income in the long position. Eventually interest rates increased, increasing the cost of borrowing and decreasing the value of the long positions. The county quickly found itself unable to meet its obligations and filed for bankruptcy. In total, the county would register losses of almost \$1.7 billion from these positions (Public Policy Institute of California).

The usage of derivatives for speculation can also be found in exchange traded funds (ETFs). An ETF is a fund, set up in a similar manner to a mutual fund or index fund, which then lists shares of participation on an exchange. There are multiple types of ETFs, including passively managed and actively managed funds. Passive funds are similar to index fund, where the fund is setup in a certain manner, and allowed to operate without a fund manager making constant investment decisions. Usually these funds are created to mirror an area or sector of the market. For example, the SPDR S&P 500 ETF is a fund issued by State Street to replicate the portfolio of companies in the S&P 500.

Actively managed funds, on the other hand, allow fund managers to make investment decisions. Many of the actively managed funds have significant undertakings of leverage and derivatives. These funds take on this significant amount in order to be able to outperform the fund's benchmark. There are over 275 leveraged ETFs with an asset balance of \$33 billion.

These funds attempt to outperform their only benchmark in the short term. For this reason, the funds rapidly undertake and relinquish positions in the derivatives market. The short-term focus of these funds also mitigates the ability of the ETF to appreciate in value. Most leveraged ETFs have not actually follow the indices over time (Light). This process of rebalancing derivatives could present problems in the case of problems with liquidity. If an ETF is unable to properly rebalance the derivatives in the portfolio, or if the derivatives started to post significant losses, investors in the ETF will suffer, as asset value will drastically decline. ETF's adoption of derivatives is another form of speculation. The derivatives are being purchased as a means of generating returns, versus hedging or arbitrage.

Today, derivatives also find themselves in passive ETFs. These types of ETFs are ones where a fund manager is not making active decisions regarding what to include. Instead, the funds are setup to replicate some other portfolio, such as the S&P 500. With so many passive ETFs attempting to match certain portfolios, a frequent problem these funds face is access to the necessary number of shares. Many of these funds have turned to derivatives as a way to take the necessary positions. Not only can derivatives be found in actively managed funds, but passive ETFs are also taking a position in derivatives. Since these funds do not have an underlying position to hedge, the fund is entering the position naked, this fits the definition of speculation, meaning that even passively managed funds are speculating on derivatives in today's market.

Similar to Paulson, Orange County and ETFs use derivatives for speculation. The purpose of the derivatives was to make money—to increase the revenue generated from the positions, not to hedge a position, nor take advantage of arbitrage. Despite both having implemented speculative strategies through derivatives, Paulson and Orange County had

drastically opposing outcomes. These examples do, however, demonstrate that derivatives are used as a speculation tool in today's market.

Arbitrage

A major usage of derivatives in today's market revolves around the implementation of an arbitrage strategy. Arbitrage strategies are used by both hedge funds and mutual funds. "The underlying mechanism of these funds is to capture the difference in prices of the same equity share listed on two exchanges and/or on the derivative segment," (Goyal). These funds are taking two sides to a position—regardless of the direction an asset's value heads, no change in profit will occur. A simple example of arbitrage would be a fund that purchases an asset in one exchange, and sells that same asset, at a higher price, on another exchange. Most of the implemented arbitrage strategies, however, are quite complicated, and involved the usage of derivatives. A fund may purchase stock, and sell derivatives for a riskless profit, or vice versa (Goyal).

The profit that is generated through arbitrage is usually very small. These funds take advantage of frequent trading, and the implementation of effective strategies in order to generate a significant enough return. Since many of the funds are heavily invested in the derivatives market, however, this investment strategy has increased the amount of derivatives on the market. Many of these funds are attempting to create and sell derivative contracts into the market. Other strategies demand more derivatives, and as a result the derivative markets have increased in size and liquidity (Sill).

These strategies are not just limited to equity derivatives as well. Arbitrage opportunities can appear in any market, and as a result, there are arbitrage firms implementing this type of trading in every market (Sill). These strategies are purported to be riskless, since arbitrageurs are

taking two opposing sides to a position. Yet, there are other risks that are being undertaken when implementing such a strategy. As previously discussed, the idea of counterparty risk is always prevalent in the use of contracts. When an arbitrage firm purchases derivatives in order to implement such a strategy, the firm is still facing risk from the counterparty that sold the derivative. If the firm is unable to settle the contract, then the arbitrage strategy does not work. Knowledge of a firm's future inability to settle a contract is not known at the time of purchase, however. This supposedly riskless technique is only riskless in terms of the market. The firms using this strategy are still subject to many outside risks.

Despite the fact that arbitrage firms are supposed to undertake riskless positions, the complex trading strategies may not always result be riskless. Often times, the strategies and firms have so many working parts that the firms do hold significant risk in an arbitrage strategy. The result of arbitrage strategies that were not implemented without risk can be seen with the hedge fund Long Term Capital Management.

Long Term Capital Management was a hedge fund based in Greenwich, Connecticut. The fund was started by John Meriwether, a former bond trader at Salomon Brothers. Meriwether would eventually recruit Myron Scholes and Robert Merton, who were two of the economists that created the Black-Scholes model for derivatives (Shirreff). The hedge fund mostly implemented an arbitrage trading strategy in the area of fixed income. Most of Long Term Capital Management's strategies involved the heavy use of derivatives. The firm would take frequent positions in interest rate swaps to create arbitrage regarding interest rate spreads. Long Term Capital Management was also, "one of the biggest players on the world's futures exchanges, not only in debt but also equity products," (Shirreff).

Originally, the firm was highly successful at implementing the arbitrage strategy. After starting in 1994 with an equity base of \$1.3 billion, the company had expanded to over \$7 billion in 1997. The firm had posted annual returns of over 40% after fees in both 1995 and 1996. In order to achieve these returns, however, Long Term Capital Management had to undertake significant leverage and borrowing (Allington, McCombie and Pike).

In 1998, Long Term Capital Management was investing under the belief that interest rates would converge between treasury security and those that required a premium. During that year, Russia announced that it was defaulting on its bonds, and investors started to flee all debt securities in favor of treasuries. As a result, the interest rates took a drastic divergence. “On one single day, August 21, the LTCM portfolio lost \$550 million,” (Shirreff). As the fund continued to post losses on its bets, the capital base shrunk, but the liabilities in terms of derivatives did not, and as a result, “the leverage ratio reached an extraordinary 250:1,” (Allington, McCombie and Pike).

With Long Term Capital Management having bought and sold positions throughout the street, the fund was considered too interconnected with the rest of the market to fail (Allington, McCombie and Pike). Eventually, multiple other financial institutions would raise funds to help bailout the failed hedge fund.

In the failure of a complex trading hedge fund, it is difficult to generate a single cause for the failure. In the case with Long Term Capital Management, there were multiple failures by the fund, as well as the rest of the street. What is pertinent about this example is the use of derivatives by an arbitrage firm. These firms are purporting a supposedly riskless position, as well as profit. Yet, in the case of Long Term Capital Management, the firm was obviously taking on derivatives in a risk position. Are arbitrage firms riskless? The case of Long Term Capital

Management demonstrates that these firms may not be. With the significant positions in derivatives the firm took, without the necessary equity base to support the leverage, the firm was clearly not riskless (Shirreff).

Arbitrage is a well-known market practice, which has been implemented for many decades. As technology and trading abilities have expanded, however, the market has sought new ways to implement arbitrage opportunities. Today, derivatives are commonplace in the portfolio of arbitrageurs. Despite the fact that by definition arbitrage is supposed to be riskless, many of these firms are using derivatives and arbitrage strategies in ways that expose the positions to significant risk.

Derivatives have seen significant development in the market since their inception. Today's usage of derivative includes it in the business model of almost every major company, and with multiple reasons for usage. The polarizing examples of successes and failures with these many strategies paint an excellent picture about derivatives. Derivatives in the marketplace today have seen a significant shift from their original development.

Shifts in Usage

Derivatives usage today has clearly seen a shift from the original purpose of the financial instruments. The original purpose of derivatives, risk management, is still prevalent today. Yet, new uses of derivatives have populated the market. Today, derivatives are being used by most companies, both in and out of the financial industry, and no longer just for hedging purposes.

When derivatives were first popularized, producers of commodity products were demanding these instruments as a means of locking in a set price. Grain producers were looking to take advantage of the high price of grain in the off-season, by guaranteeing a minimum

purchase price in the future. These contracts were a way for the grain producers to hedge price risk on their assets. Risk management was the reason for the creation of these early derivatives.

As the derivatives market expanded, the expansion developed over attempting to hedge more risks. New instruments were being created, as non-financial companies started to demand the ability to hedge more risks. Instruments such as interest rate swaps and currency futures were invented to help companies manage the risks that they experienced in their business models. “Credit Default Swaps (CDS) were originally created in the mid-1990s as a means to transfer credit exposure for commercial loans and to free up regulatory capital in commercial banks,” (Zabel). The derivatives market had a very clear purpose for the creation of such instruments. These instruments were created for risk management.

Today’s usage of derivatives creates a significantly different picture. Many companies still use derivatives for the purpose of hedging, like the example of Hershey’s demonstrates. As the Internal Swaps and Derivatives Association discovered, 94% of major companies use derivatives in risk management strategies (Internation Swap and Derivatives Association). Hedging through the use of derivatives is also popular within major financial companies, who frequently use these instruments to offset risky positions or counterparty risk exposures (European Central Bank).

New uses of derivatives have also appeared, including speculation. Speculation, in the derivatives market, means using the instruments to make a judgment about the future direction of the underlying instrument. Frequently, speculators do not own the underlying asset, or intend to exercise the contract. John Paulson’s bet on the direction housing market epitomizes how speculators use derivatives. These speculators are undertaking contracts as a means of making money, not as a hedging mechanism. A common outcome of the derivatives market is a contract

with opposing speculators. This means that each person in the contract is using the contract as a means of attempting to make money if the market heads in a certain direction (Lynch, *Gambling by Another Name; The Challenge of Purely Speculative Derivatives*). Neither party is hedged; in fact both are undertaking significant risk in the contract. These contracts demonstrate a shift from the original purpose of derivatives, to hedge, as risks are being created for both companies in the trade.

Finally, derivatives have become commonplace in arbitrage strategies. Though by definition these firms are supposed to be market neutral, or hedged, these firms are not undertaking derivative contracts as a means of achieving the hedged status. These firms see discrepancies in pricing of the markets, and use derivatives as a method of utilizing the discrepancies to make a profit.

With today's usage of derivatives, it is clear that derivatives have morphed over time. Derivatives have seen a major shift the implementation, and treatment within business models. This change is not just limited to financial firms as well. According to Chernenko and Faulkender, non-financial firms have started to use derivatives to speculate. This shift demonstrates that derivatives have seen a clear transformation. These instruments, which were originally meant to mitigate risks in a company, are now being used in ways that create significant risks. The new usage of derivatives has lead Warren Buffett to state, "derivatives are financial weapons of mass destruction, carrying dangers that, while now latent, are potentially lethal," (Berkshire Hathaway).

This significant shift of the purpose of derivatives has come about due to the profitability of the contracts. As Timothy O'Brien of *The New York Times* describes, "derivatives contracts make a lot of money," (O'Brien). Banks that underwrote the contracts were able to write

significant contracts, without having to undertake large capital reserves. Many of the contracts would expire, without the bank having to settle. “The derivatives were a major source of revenues for a few big banks, and those who were making lots of money out of it obviously wanted to continue with the source of money,” (Stiglitz).

Outside of banks, other companies are seeking increased profits through derivatives usage. Example of the dramatic successes of derivatives, such as with Paulson & Company creates an attraction to this form of leverage. Many companies have started to undertake derivatives trading as a means of supplementing the core aspect of the business.

In conclusion, today’s usage of derivatives throughout all types of companies demonstrates the integral change to the derivatives market. This is no longer a market that consists of risk transfer. Instead, this market is creating contracts that create risks. Derivatives are no longer just a hedge; this market has seen a significant shift from this original purpose due to profitability that could be generated through these contracts. This type of trading, however, turns these instruments from a safe bet, to, “time bombs, both for the parties that deal in them and the economic system,” (Berkshire Hathaway).

Conclusion

The consequences of derivatives have received significant attention over the last few years. Many of the spectacular results have been popularized, with the successful managers treated as a deity of the market. John Paulson’s trading strategy through the housing crisis was deemed, “the greatest trade in history,” (Zuckerman). The greatest trade netted Paulson a \$3 billion payout from his hedge fund, which made \$15 billion.

Derivatives have also seen significant attention due to the spectacular failures of many of the users of the instruments. Following the financial crisis, derivatives received significant blame for causing the meltdown. During the housing boom, AIG would sell over \$450 billion in notional value of protection against highly rated mortgage securities. As the housing market turned sour, counterparties made a \$100 billion collateral call against the insurance giant. The company, which had simultaneously taken a hit to its capital base, was unable to post the collateral. The United States government would eventually bail out AIG, which would consume more than \$180 billion of taxpayers' money (Sundaram). The failure of AIG, due to credit default swaps, would bring this instrument significant scrutiny.

Many of these criticisms of derivatives have questioned the creation of such potent financial instruments. Yet, the original purpose of derivatives had a significantly different purpose. These financial instruments have their origins based in the commodity and currency markets, where they were used as a method of hedging. Derivatives were created to help transfer risks away from companies that experienced the risk in normal business activities. Risk was attempting to be mitigated by the creation of derivatives, not created despite the recent outcomes of many derivative traders.

This idea, however, opposes the use of derivatives today. Derivatives have become commonplace in speculation and arbitrage strategies. The contracts have extraordinary returns, which attract these investors. Non-financial companies have even begun to use these instruments as a method of supplementing income and revenue. The derivatives market has seen a change to the usage a derivatives; no longer are they used only for the original purpose of hedging.

There are countless examples of the way companies use derivatives today, including Long Term Capital Management and Orange County. These examples exemplify both the new

uses and the way derivatives can be perilous. Derivatives have caused the destruction of many firms who abused such instruments, and made poor investing decisions. Yet, despite this, many firms continue to use these potent instruments in the same way.

Recently, the government has attempted to increase the regulation regarding many of these instruments. Following the financial crisis, the government implemented the Dodd-Frank act, which attempts to tackle many of the problems of this area of the market. Yet, the problem of the market stems directly from the market itself. “The problem is, no one really knows exactly what derivatives are being used for because it all exists in a black box. They're unregulated; the contracts aren't traded on exchanges; they're entered into between private parties,” (O'Brien). The largest sector of this market is the OTC sector, with \$647 trillion in notional value outstanding. The OTC involves major market players, who negotiate complex trades bilaterally (Sundaram). For this reason, regulators have allowed the markets to operate with little regulation or reporting standards. Banks have continued to argue for this lack of regulation as well. A bank that is, “selling these things, has an interest in there being less open information about them because they get a bigger fee for it, and they can control the pricing in a better way,” (O'Brien).

Recent regulation has forced financial institutions to start using Central Clearinghouses more frequently. These clearinghouses act as an intermediary between the trades, meaning that the clearinghouse takes the counterparty position on each half of the trade. In this case, there is essentially two trades, each one facing the clearinghouse as the counterparty, versus facing the original counterparty. This regulation is suppose to decrease the counterparty risk for financial institutions, since the clearinghouse will be the counterparty for all these trades, instead of having thousands of counterparties.

Though regulations such as the one outlined above are starting to have an impact on the control of risk in this market, more regulation would be needed to control the market. As the market continues to be privately negotiated and settle, it continues to be difficult to know what risk a bank is undertaking.

“No one knows whether or not one company, let's, for example, call them AIG, a big insurance company, has entered into so many of these contracts that if an unforeseen financial hurricane comes and hits the house known as Wall Street and suddenly AIG is required to make good on ... so many of these policies that they don't have enough money to do this, and they run into danger of going belly up,” (O'Brien)

These markets should increase the reporting standards for these types of settlements. This would allow regulators to better understand what risks the banks are taking in all of these deals. This would also create more transparency on the activities of non-financial companies in this area of the market. The undertaking of too much leverage and risk in a concentrated bet is a common theme between most company failures through derivatives. Increasing reporting regulations would allow regulators, investors, and other business professionals to see if a company has undertaken too much concentrated risk. “The only way you can get a handle on what the nature of the derivatives market is and whether or not some of the players are taking on more than they can swallow is if you have transparency. And we have not had transparency in the derivatives market for a very long time,” (O'Brien). The private nature of this market is integral to banks making a significant profit. Increasing of reporting regulations may decrease the amount of profit a bank can make in this sector, but could be a necessary hit to help prevent another market failure.

If changes to this market do not come about, it is likely that the market will continue to repeat itself. Long Term Capital Management collapsed for the same reason that the entire

financial institution was on the brink of collapse in the financial crisis. Companies undertook many financial instruments betting on one direction of the market, when the exact opposite happened. Then, the use of derivatives and leverage exacerbated the problem. If the market was unable to learn from Long Term Capital Management, despite the popularity of the meltdown, it seems unlikely to learn from the financial crisis.

It appears that the market did not learn, as well. Derivative usage today has surpassed the usage leading up to the financial crisis. Hedge funds, major users of derivatives, continue to become popular, and have trillions under management. Today, derivatives have found their way into all parts of the market, including non-financial institutions, and exchange-traded-funds. The market is consuming these instruments at record pace.

As of now, the market continues to use derivatives for many different reasons. Despite the fact that derivatives were created to lessen risk, today's usage is creating more risk. Millions of people have been affected by the outcome of derivatives. Yet the market continues to use derivatives for speculation. The past decade of derivatives use has shed light on the reason why Warren Buffett described them as "financial weapons of mass destruction," (Berkshire Hathaway). These instruments, when used for these purpose have collapsed many companies. Without more effective regulation, however, this path seems likely to continue, with much more destruction likely.

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